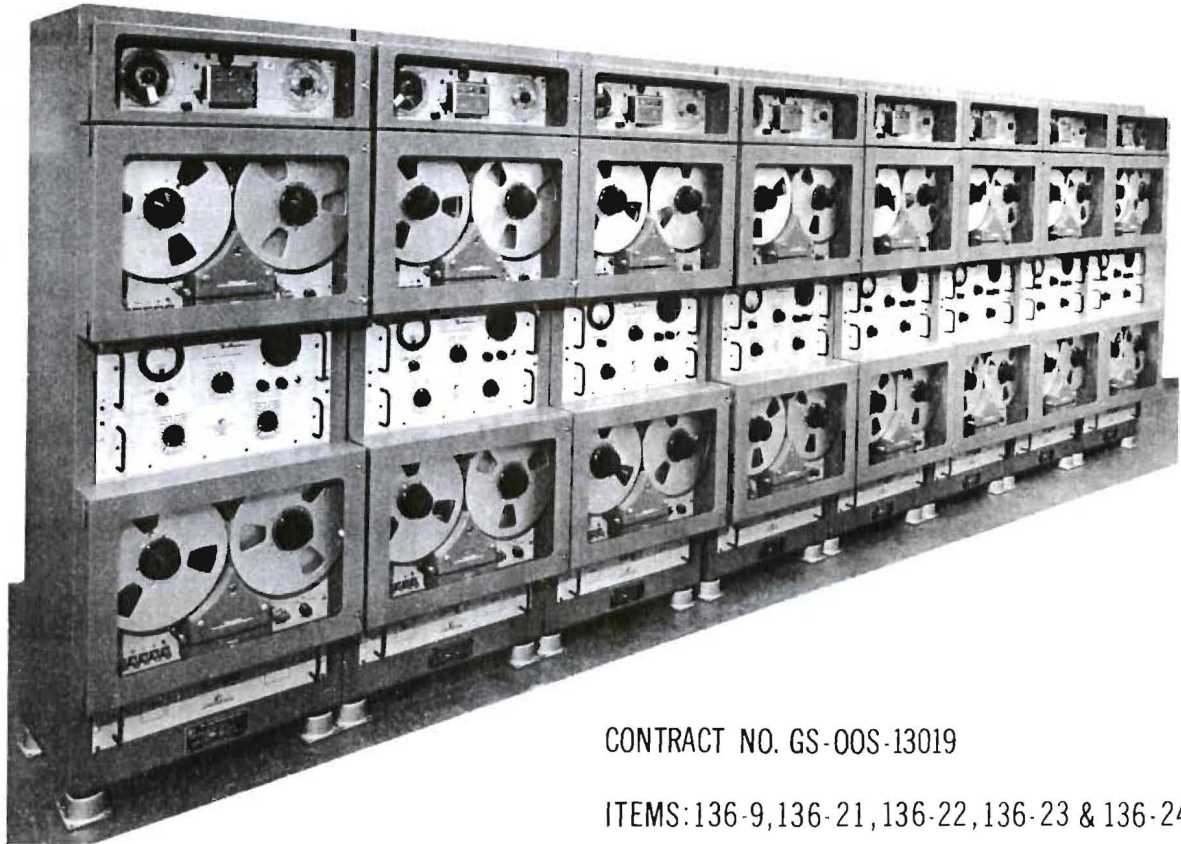


FEDERAL SUPPLY SCHEDULE  
GENERAL SERVICES ADMINISTRATION  
FEDERAL SUPPLY SERVICE  
FSC GROUP 58--Part III--Section B  
COMMUNICATION EQUIPMENT

## PRICE LIST

GSA Distribution Code: 00SC-5804

Class 5835 Audio Recording and Reproducing Equipment



CONTRACT NO. GS-00S-13019

ITEMS: 136-9, 136-21, 136-22, 136-23 & 136-24

Effective: August 3, 1972 to June 30, 1973

## MAGNETIC TAPE RECORDERS & REPRODUCER SETS

**THE STANCIL-HOFFMAN CORPORATION**

921 NORTH HIGHLAND AVENUE • HOLLYWOOD, CALIFORNIA 90038 • (213) 464-7461 • CABLE STANHOF

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**ORDERING INFORMATION**GENERAL

Please be sure to include all of the information requested below on your purchase order. This will ensure that you receive the correct model from the many different types available. If you require additional information, please write or call:

STANCIL-HOFFMAN CORPORATION  
921 North Highland Avenue  
Hollywood, California 90038  
Attn: Customer Service  
Telephone: (213) 464-7461  
CABLE STANHOFF

HOW TO ORDER

1. Select the item(s) desired from this catalog.
2. Prepare a purchase order which includes the following information:
  - a) Model number
  - b) Catalog number
  - c) Price
  - d) Accessories desired (including cabinet when not part of model desired)
  - e) Packing instructions if outside contiguous 48 states and District of Columbia
3. Send order to:

STANCIL-HOFFMAN CORPORATION  
921 North Highland Avenue  
Hollywood, California 90038

4. If any equipment is received in damaged condition, the Government Agency will immediately advise Stancil-Hoffman Corporation, Hollywood, California, by collect wire, indicating purchase order number, serial number of item (if any), extent of damage and when items may be inspected.

PRICES

Prices are shown for equipment and accessories F.O.B. destination the 48 contiguous states and District of Columbia.

Under terms of this contract, Stancil-Hoffman may not accept an order consisting of a combination of items which amount exceeds \$100,000 (exclusive of any discounts for prompt payment).

Small requirements under \$50.00 will be accepted but not less than a minimum billing of \$25.00.

INSTALLATION, INSTRUCTION AND PREVENTIVE MAINTENANCE

Instructions included in the manuals shipped with each recorder/reproducer.

DELIVERY

Time of delivery is within 60 days after receipt of order.



## GENERAL DESCRIPTION CRM SERIES 10 &amp; 20 Channel

These recorder/reproducers are designed to record voice communications from two-way radio systems, telephone circuits, surveillance systems and communication networks. A reel of tape has a capacity of over 25 hours or 50 hours of continuous recording; or, with an accessory voice-operated relay which actuates the tape drive only when there are signals, a reel of tape may span a week or more.

Stancil-Hoffman supplies these recorders to USAF for portable and fixed airport control tower operations. The Navy uses them for Missile Range Communication and data recording. Other governmental and commercial applications include:

- o Police and Fire Departments
- o Intelligence
- o Radio and TV Broadcast Logging
- o Courtroom Recording
- o Security Systems
- o Training and Conference Recording

There is a choice between two types of tape transports. The basic facilities and performance are identical in both types and the electronics are common to both.

The space saving and least expensive CRM-10/20 series use 7-inch diameter reels permitting compact fixed and portable mobile installations. The CRM-100/200 series use 10½ inch diameter reels and are similar to the AN/GSH-34 systems supplied to the USAF.

With either type of transport, the three most widely used systems are:

1. "A" SYSTEM -- Single tape transport with electronics to record multi-tracks and reproduce two channels: one channel to play back any track selected, and the second channel to play back a fixed track on which may be recorded time of day information.
2. "B" SYSTEM -- Single transport with electronics to record multi-tracks with as many simultaneous playback channels as there are recorded tracks.
3. "F" SYSTEM -- Dual transports with electronics for continuous recording. At 24 hours, or other selected intervals, a built-in time clock transfers operation from one transport to the second transport at which time both transports record in overlap.

The "F" system further provides for malfunction and failsafe sensing to transfer operation from the primary transport to the standby transport. Also, both transports may record in parallel using one transport for immediate playback without affecting the recording function of the other transport.

The full line of accessories listed can expand the versatility of these systems. Some of the models are completely documented by the government and many spare parts are in government inventory. A complete manual with parts list is furnished with each system.

The 10-channel recorders use ½" wide tape and the 20-channel uses 1" wide tape. A reel having 3600' is required for 25 hours recording. Contact Stancil-Hoffman for the correct tape to use with each model.

## ORDERING INFORMATION (Continued)

PRESERVATION, PACKAGING AND PACKING

All items will be packaged and packed in accordance with Preservation and Packaging Level C, per Federal Standard 102b. On written request, export packing in accordance with MIL specifications is available for an additional charge of 5 percent of the unit cost, and will be invoiced as a separate item.

TERMS OF PAYMENT

Net 30 days from date of invoice. Discount 2% allowed for payment in 10 days.

STATE AND LOCAL TAXES

The prices shown do not include state or local taxes. Taxes excluded from the contract in accordance with the provisions of this contract shall be separately stated on the invoices and the Government agrees either to pay amounts covering these taxes or to provide evidence necessary to sustain an exemption therefrom.

GUARANTEE

All necessary adjustments of machines procured hereunder and delivered within the 48 contiguous states and the District of Columbia, not occasioned by accident or misuse, shall be made by the Stancil-Hoffman

Corporation including transportation costs, if any, during the 90-day period after delivery. All machines procured and delivered as above are guaranteed for one year from date of delivery, except expendable items such as tubes, transistors and magnetic heads which are guaranteed for 90 days from date of delivery. During the guarantee period, all broken or defective parts not caused by accident, misuse, or through fault or negligence by the Government will be replaced including transportation costs, if any.

Payment Address:

STANCIL-HOFFMAN CORPORATION  
921 North Highland Ave.  
Hollywood, California 90038

ELECTRICAL POWER

Each machine procured hereunder shall operate on a nominal 115 volt 60 Hz alternating current, single phase power, except on special order. Underwriters Approved 3 wire power cords with grounding conductor plug are supplied where AC connections are required. NOTE: Not certified for R.I.F. 3 wire grounded AC connector furnished.

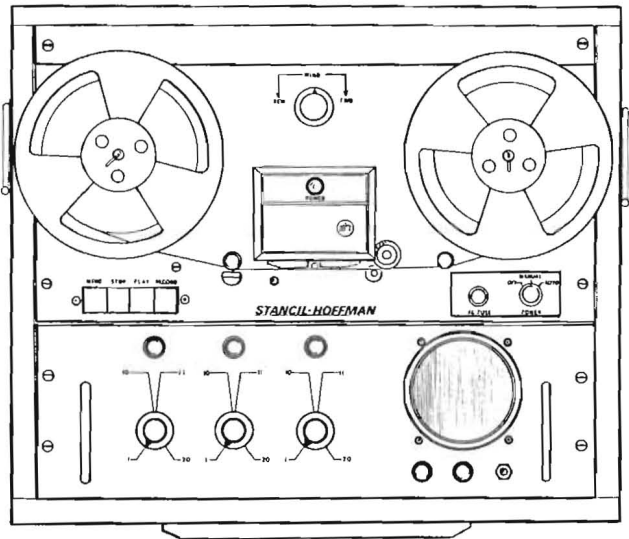
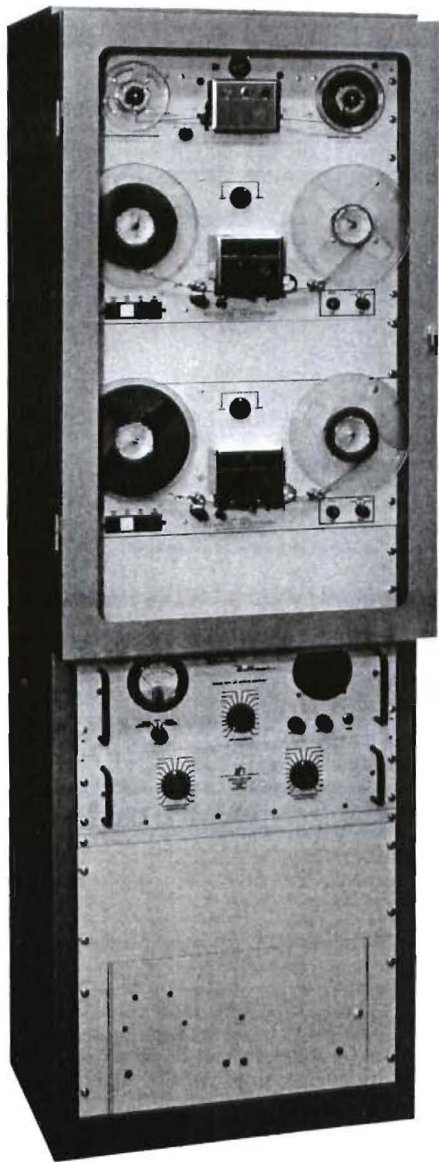
All items listed in this catalog are manufactured in the United States by the Stancil-Hoffman Corporation, a small business concern located in a designated labor-surplus area.

MODEL CRM-10/20  
RECORDER-REPRODUCERS

These systems record up to either 10 or 20 channels for 25 hours and are available in single "A" & "B" or dual transport "F" configurations.

The CRM-20F (left) is equipped with the accessory Voice Time Announcer and "See Through" doors which protect the tape reels and mechanical parts of the transports leaving all monitoring controls -- which can have no effect on the recording -- available.

The companion CPM-23 Sound Reproducer (below) is a portable playback unit used for remote playback of previously recorded tapes. The selector switches provide individual playback of any channel or simultaneous playback of any three separate channels on a built-in loudspeaker



Special Item No. 136-9

MODEL	CATALOG NUMBER	COM. PRICE	GSA PRICE	DESCRIPTION
CRM-10A	2567106	\$3881	\$3493	Single transport with 10/20 channels of recording and a single reproduce amplifier switchable from track to track.
CRM-20A	3679106	\$4761	\$4285	
CRM-10B	2567006	\$4554	\$4099	Single transport with 10/20 channels of recording and 10/20 reproduce amplifiers.
CRM-20B	3679006	\$6003	\$5403	
CRM-10F	2567206	\$6055	\$5450	Dual transports sharing one set of 10/20 channel recording electronics. A reproduce amplifier for each transport is switchable from track to track. Housed in a single floor standing cabinet.
CRM-20F	3679206	\$8228	\$7405	

GSA Discount is 10%



Model CRM 10 & 20 RECORDER-REPRODUCERS

TECHNICAL SPECIFICATIONS

	CRM-10	CRM-20
CHANNEL CAPACITY.....	up to 10 channels	up to 20 channels
TAPE & REEL SIZE.....	1/2" tape on 7" reel	1" tape on 7" reel
RECORDING TIME.....	25.6 hours on a 3600' reel of 1/2 mil triple play tape	
TAPE SPEED.....	15/32 IPS (15/16 IPS and other speeds available on special order)	
HEADS.....	In-line construction, only one record and one playback head is required. No expensive multiple interlace heads are used.	
INPUT SENSITIVITY.....	+20 to -20 dbm, adjustable in each channel	
INPUT IMPEDANCE.....	10,000 ohm transformer, ungrounded, to bridge 600 ohm lines. A DC blocking capacitor is included in the input module for telephone line connection.	
AUTOMATIC GAIN CONTROL.....	(Optional on each channel) Provides constant record level ±2 db with input variations up to 40 db. Input sensitivity is adjustable from -30 to +15 db.	
FREQUENCY RESPONSE.....	300 to 3000 Hz ±3 db	
SIGNAL TO NOISE.....	better than 35 db	
CROSSTALK REJECTION.....	better than 35 db	
DISTORTION.....	less than 3%	
WOW & FLUTTER.....	less than 1%	
BIAS FREQUENCY.....	75 KHz nominal	
ELECTRONICS.....	Solid state housed in shielded color coded, plug in cans.	
DRIVE SYSTEM.....	Three motor drive; two direct coupled reel torque motors. The capstan is driven through precision belts and two heavy fly-wheels.	
BRAKING SYSTEM.....	Adjustment-free electro-dynamic braking with patented Motion Memory Sensor.	
CONTROLS.....	Illuminated momentary pushbuttons activate low voltage DC relays for all mode selections. Operating modes are STOP, PLAY, RECORD and WIND. All modes may be remotely controlled.	
CUE.....	The tape is automatically lifted from the heads in the WIND modes. A manually operated lever arm returns the tape to heads for CUEING purposes.	
PHOTO CELL.....	A photo cell senses a light beam across the tape path. When the tape supply is exhausted, the photo cell action will automatically return the transport to the STOP mode.	
TAPE SEARCH.....	Tape speed and direction are continuously variable in WIND mode by single knob control.	
MONITORING.....	The input to or output from any track as chosen by the channel selector switch is monitored by a built-in loud speaker, head phone jack, and volume meter. A fixed channel, which may be used for time reference, may be mixed with the output of any selected message channel.	
AUTO/REMOTE.....	Units may be remotely controlled or automatically programmed. Complete circuitry is furnished for automatic transfer from one tape deck to a standby deck.	
MALFUNCTION SENSING.....	Malfunction of the power supply, bias oscillator, or tape breakage and end of tape are sensed and cause transfer to standby tape deck if desired.	
"FAILSAFE RECORDING".....	(Optional) subaudible 35 Hz signal recorded on each track is sensed to verify record and playback performance.	
PANEL MOUNTING.....	All panels and chassis are suspended on slides offering easy withdrawal or removal.	
POWER SUPPLY.....	Power supplies are short circuit proof, voltage regulated and separate units are furnished for each transport.	

Model CPM 10 & 20 REPRODUCERS

Special Item #136-21

MODEL	CATALOG NUMBER	COM. PRICE	GSA* PRICE	DESCRIPTION
CPM-13	2567306	\$2329	\$2096	Ten/twenty channel reproducer only using 3 playback amplifiers switchable to any one or combination of 3 tracks.
CPM-23	3679306	\$3100	\$2790	
CPM-10	2566406	\$2846	\$2561	Ten/twenty channel reproducer using 10/20 playback amplifiers to permit simultaneous playback of all tracks.
CPM-20	3679406	\$4192	\$3773	

\*GSA Discount is 10%

MODEL CRM-100/200  
RECORDER-REPRODUCERS

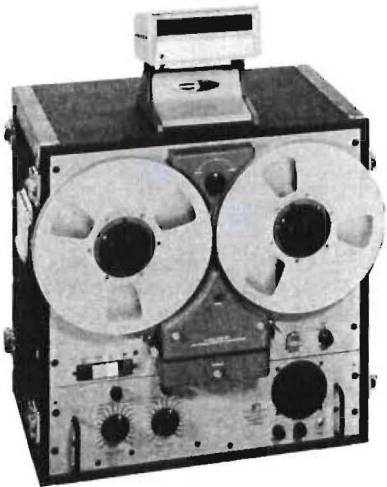
These 10 and 20 channel systems use 10½-inch-diameter reels to extend the operating time to 50 hours per reel using triple play ½ mil tape or 25 hours with 1 mil tape.

Features over and above the 7-inch-reel Model CRM-10/20 include solenoid-operated CUE tape lift and solenoid-operated brakes to handle the larger reels.

The CRM-100F ten channel dual transport system is illustrated with the accessory "See Through" protective doors.

Also included is the accessory Voice Time Announcer at top of cabinet. The CRM series are generally equipped with the subaudio "failsafe" recorded signal on each track to verify the recording and reproduction sequence. Should there be a failure, transfer is accomplished from one transport to the other with appropriate alarm and indication.

The companion Sound Reproducer (below) is a portable playback unit used for remote playback of previously recorded tapes. The selector switches provide individual playback of any channel or simultaneous playback of any three separate channels on a built-in loudspeaker.



Special Item No. 136-9

MODEL	CATALOG NUMBER	COM. PRICE	*GSA PRICE	DESCRIPTION
CRM-100A	2566106	\$4583	\$4125	Single transport with 10/20 channels of recording and a single reproduce amplifier switchable from track to track.
CRM-200A	3678106	\$6549	\$5894	
CRM-100B	2566006	\$5457	\$4911	Single transport with 10/20 channels of recording and 10/20 reproduce amplifiers.
CRM-200B	3678006	\$7811	\$7030	
CRM-100F	2566206	\$6549	\$5894	Dual transports sharing one set of 10/20 channel recording electronics. A reproduce amplifier for each transport is switchable from track to track. Housed in a single floor standing cabinet.
CRM-200F	3678206	\$10776	\$9698	

\*GSA Discount is 10%



MODEL CRM-100/200 RECORDER-REPRODUCERS

TECHNICAL SPECIFICATIONS

	CRM-100	CRM-200
CHANNEL CAPACITY.....	up to 10 channels	up to 20 channels
TAPE & REEL SIZE.....	1/2" tape on 10 1/2" NAB reel	1" tape on 10 1/2" NAB reel
RECORDING TIME.....	25.6 hours on a 3600' reel of 1 mil tape, or 51.2 hours when using 7200' of 1/2 mil triple play tape.	
TAPE SPEED.....	15/32 IPS (15/16 IPS and other speeds available on special order).	
HEADS.....	In-line construction; only one record and one playback head are required. No expensive multiple interlace heads are used.	
INPUT SENSITIVITY.....	+20 to -20 dbm, adjustable in each channel.	
INPUT IMPEDANCE.....	10,000 ohm transformer, ungrounded, to bridge 600 ohm lines. A D.C. blocking capacitor is included in the input module for telephone line connection.	
AUTOMATIC GAIN CONTROL.....	(Optional on each channel) Provides constant record level ±2 db with input variations up to 40 db. Input sensitivity is adjustable from -30 to +15 db.	
FREQUENCY RESPONSE.....	300 to 3000 Hz ±3 db.	
SIGNAL TO NOISE.....	better than 35 db	
CROSSTALK REJECTION.....	better than 35 db	
DISTORTION.....	less than 3%	
WOW & FLUTTER.....	less than 1%	
BIAS FREQUENCY.....	75 KHz nominal	
ELECTRONICS.....	Solid state housed in shielded color coded, plug in cans.	
DRIVE SYSTEM.....	3 motor drive; 2 direct coupled reel torque motors, and a hysteresis synchronous motor driving the capstan through precision belts and 2 heavy flywheels.	
BRAKING SYSTEM.....	Solenoid operated brakes. Brakes are automatically set after power failure to prevent tape spillage.	
CONTROLS.....	Illuminated momentary pushbuttons activate low voltage DC relays for all mode selections. Operating modes are CUE, STOP, PLAY, RECORD and WIND. All modes may be remotely controlled.	
CUE.....	The tape is automatically lifted from the heads in the WIND modes by a solenoid operated tape lift. The CUE button is used to return the tape to the heads for CUEING purposes.	
PHOTO CELL.....	A photo cell senses a light beam across the tape path. When the tape supply is exhausted, the photo cell action will automatically return the transport to the STOP mode.	
TAPE SEARCH.....	Tape speed and direction are continuously variable in WIND mode by single knob control.	
MONITORING.....	The input to or output from any track as chosen by the channel selector switch is monitored by a built-in loud speaker, head phone jack, and volume meter. A fixed channel, which may be used for time reference, may be mixed with the output of any selected message channel.	
AUTO/REMOTE.....	Units may be remotely controlled or automatically programmed. Complete circuitry is furnished for automatic transfer from one tape deck to a standby deck.	
MALFUNCTION SENSING.....	Malfunction of the power supply, bias oscillator, or tape breakage and end of tape are sensed and cause transfer to standby tape deck if desired.	
"FAILSAFE RECORDING".....	(Optional) Subaudible 35 Hz signal recorded on each track is sensed to verify record and playback performance.	
PANEL MOUNTING.....	All panels and chassis are suspended on slides offering easy withdrawal or removal.	
POWER SUPPLY.....	Power supplies are short circuit proof, voltage regulated and separate units are furnished for each transport.	

MODEL CPM-100/200 REPRODUCERS

Special Item #136-21

MODEL	CATALOG NUMBER	COM. PRICE	*GSA PRICE	DESCRIPTION
CPM-103	2566306	\$2868	\$2581	Ten/twenty channel reproducer only using three playback amplifiers switchable to any one or combination of 3 tracks
CPM-203	3678306	\$4010	\$3609	
CPM-100	2567406	\$3983	\$3585	Ten/twenty channel reproducer using 10/20 playback amplifiers to permit simultaneous playback of all tracks.
CPM-200	3679506	\$6549	\$5894	

\*GSA Discount is 10%

## SPECIAL ITEM #136-22 ACCESSORIES

## CRM SERIES

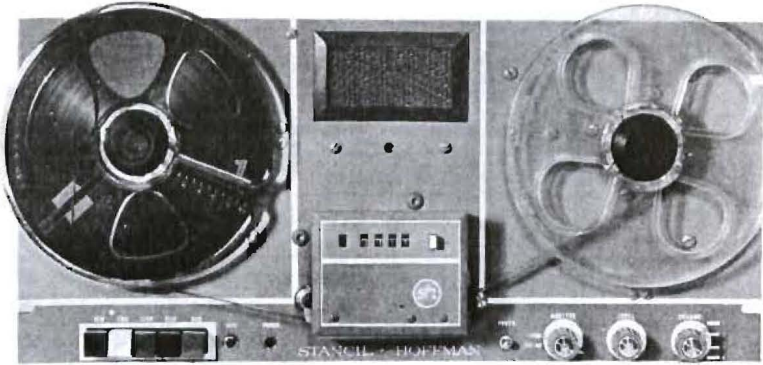
DESCRIPTION	MODEL	USED ON	CATALOG NUMBER	COMMERCIAL PRICE	*GSA PRICE
REMOTE ALARM PANEL - Lights indicate Standby, Record or Malfunction status of dual recorders; also has malfunction alarm buzzer with override switch.	IP2000	1-4	201059	\$ 160.50	\$ 144.45
TIME SIGNAL MUTE PANEL - Permits recording of both time information and a message on the same track giving priority to the message signal (for use with TT-2460 Time Announcer or the TT-2470 Digital Time).	CU99	1-4	201054	181.00	162.90
REMOTE CONTROL & MONITOR PANEL - Lever switches for remote control of all normal recorder functions and recall control. Switch selectable monitoring of any audio channel.	CU10EA CU20EA CU100EA CU200EA	1 2 3 4	201043 201044 201045 201046	336.00 336.00 336.00 336.00	302.40 302.40 302.40 302.40
AUTOMATIC TIME ANNOUNCER - Furnishes voice time announcements every 60 seconds. A built-in ACCUTRON (R) battery operated clock provides visual primary time standard and triggers the 60 second announcements.	TT-2460	1-4	701611	1501.00	1350.90
DIGITAL TIME REFERENCE - Time displayed in hours, minutes and seconds. Readout from tape on separate unit displaying hours, minutes and seconds as recorded.	TT-2470	1-4	701612	2225.00	2002.50
VOICE OPERATED RELAY - To start/stop recorder when a voice or signal appears on any channel input. Consists of a drive motor control unit for each tape transport.	V0100	1,2	111001	155.00	139.50
RACK CABINET - 61½" x 19" rack space. Overall dimensions 66½" high x 22" wide x 17½" deep.	RC-1	1-4	7903	181.00	162.90
RACK CABINET - 19½" x 19" rack space. Overall dimensions 24½" high x 22" wide x 17" deep. For CRM-10A/B, 20A systems.	RC-3	1,2	7905	100.00	90.00
RACK CABINET - 26½" x 19" rack space. Overall dimensions 31½" high x 22" wide x 17" deep. For all CRM A&B systems.	RC-4	1-4	7907	109.00	98.10
SLIDES, EXTENSIBLE - To mount equipment in cabinet or carrying case. Panels may be withdrawn 11½" or completely removed.	SL-70	1-4	7920	31.00	27.90
AUTOMATIC GAIN CONTROL amplifier - plug in, 10,000 ohm bridging input. Holds constant recording level with input changes of ±20db or greater.	AC-376	1-4	6910	54.50	49.05
ERASE HEAD - Provides full width tape erasure. CRM heads are long life all ferrite construction.	OEH	1-4	9918	93.00	83.70
END-OF-TAPE WARNING - Arm riding on tape reel furnishes switch contacts for remote indication purposes.	CUT	1,2	1105	19.00	17.10
TRANSPARENT FRONT DOOR - Protects tape decks from dust and unauthorized entry. For use with RC-1 cabinet.	FPD-1	1-4	7912	150.00	135.00
FAILSAFE RECORDING SYSTEM - Subaudio signal is recorded on each track and detected in playback. Loss of failsafe signal energizes alarm and starts standby recorder.	FSK-35	1-4	1101	52.00	46.80
CABINET INSTALLATION KIT - Provides labor and materials to install CRM A or B type system into RC-3 or RC-4 cabinets.	MTK-10	1-4	1108	78.00	70.20

USED ON: 1 = CRM10, 2 = CRM-20, 3 = CRM-100, 4 = CRM-200

\*GSA Discount is 10%



## MODEL R-70 RECORDER-REPRODUCER



The Stancil-Hoffman R-70 Recorder/Reproducer has been designed specifically for the heavy demands of emergency and industrial recording. It is the culmination of more than a quarter century experience in the design and manufacture of magnetic recording equipment with every advance incorporated — temperature immune transistor electronics, gentle handling of the thinnest tapes, and all features for automatic recording and playback.

### ELECTRONICS

The R70 tape transport is mated with a control unit and an electronics chassis, providing a compact self-contained recorder/reproducer assembly. From one to four channels of recording and playback electronics are included on the electronics chassis using interchangeable plug-in modules. Stancil-Hoffman was the first company in the United States to commercially produce all transistor electronics for magnetic recording. These modules are the results of this long experience.

### CONSTRUCTION

All motors and chassis are mounted on a rigid 1/4-inch dural panel. The basic R70 transport includes the drive motor, torque motors, pushbutton switches, counter, monitor switches, loudspeaker, and head assemblies. Any component subject to wear is easily accessible for inspection or preventive maintenance. A heavy duty solenoid operates the pinch wheel through a self-compensating spring linkage eliminating adjustments and noise.

### CONTROL CHASSIS

To handle the various modes of operation and provide D.C. power for the solenoid and dynamic braking, the control unit contains the regulated power supply, bias oscillator, plug-in mode relay and all of the automatic control circuitry and connectors.

### AUTOMATION

The R-70 offers the widest versatility in magnetic recording. The units may be clock operated, signal operated or remotely operated. Complete circuitry is furnished for automatic

- POLICE, FIRE AND PUBLIC SAFETY COMMUNICATION CENTERS
- COURTROOM RECORDING
- AIRLINE COMMUNICATION
- RAILROAD COMMUNICATIONS SIGNAL SYSTEMS
- PUBLIC UTILITIES
- MUNICIPALITIES
- PRIVATE SECURITY SYSTEMS
- RADIO & TV BROADCAST LOGGING
- OFF TRACK BETTING RECORDS

transfer from one unit to a second unit or for remote back-space and pause control. A transistorized logic circuit operates a single relay for all mode control functions. This plug-in relay may be actuated by accessory units to start/stop the motor system in either record or playback from photo cells, tones, switches, or voice.

### MOTION MEMORY SENSOR

Covered by Stancil-Hoffman patent number 3,141,262 the MMS positively prevents tape damage regardless of the sequence of operation. Now you can safely switch from high speed rewind directly into "play" without stress on the thinnest tape. The reels come to a gentle stop then proceed to the next mode. Differential braking is accomplished using a sensitive switch assembly to "feel" the tape direction and balance the power to the feed and tape-up motors.

### THREE MOTOR SYSTEM

Cool running precision torque motors are directly coupled to each tape reel for velvet smooth take up/hold back tension, high speed winding, and dynamic braking. There are no mechanical brakes or clutches to get out of adjustment. The drive motor is belt coupled to two heavy flywheels for minimum flutter and wow. The entire drive system contains only 5 moving parts, and uses lifetime ball bearings requiring no maintenance.

### INTERLOCKED CONTROLS

All modes of operation are established by heavy duty push button switches. A firm mechanical interlock prevents mal-operation and a "built-in" electrical interlock prevents double or accidental recording.

### HEAD ASSEMBLY

Laminated, micro-gap heads hyperbolically shaped to operate without pressure pads are used. Separate heads provide simultaneous record and playback capability. To prevent wear, the tape is automatically lifted in winding modes. The heads are mounted on a precision plate to simplify replacement. Erase heads are optional as listed on the accessory sheets.

### ELECTRICAL SAFETY

All power cabling uses Underwriters Approved wire. The A.C. cable is three wire U.L. approved, with grounded pin. The only exposed connections are the audio input and output barrier strips. Separate enclosed fuse holders are used for A.C. and D.C. circuit protection. Most catalogued numbered models have been approved by the Los Angeles Electrical Testing Laboratory.

MODEL R-70 RECORDER-REPRODUCER

TECHNICAL SPECIFICATIONS

- TAPE AND REEL SIZE ..... 1/4 " wide by 3600' on 7" reel.
- TAPE SPEED ..... Single speed 15/32 IPS furnishing 25 hours  
(others available on special order).
- CAPSTAN SIZE ..... 1/4 " diameter for long life.
- NUMBER OF CHANNELS ..... One, two or four as ordered.
- CROSSTALK REJECTION ..... Better than 35 db at 1000 Hz.
- FREQUENCY RESPONSE ..... 15/32 IPS ±3 db to 3000 Hz. Better than 30 db S/N.
- DISTORTION ..... Less than 5% THD.
- ELECTRONICS ..... All silicon transistor plug-in modules in color-coded metal cans.
- RECORD INDICATOR ..... Front panel bias indicator lamp.
- FLUTTER AND WOW ..... Less than 1.0% RMS.
- BRAKING ..... Electro-dynamic with differential braking control.
- FAST WIND TIME ..... Less than 2 minutes.
- MODE CONTROL ..... Five pushbuttons for FAST REWIND, STOP, FAST FORWARD, PLAY and RECORD.  
(RECORD electrically interlocked with PLAY).
- CHANNEL SELECTOR ..... Selective monitor of any track in the multi-channel models.
- LIVE-TAPE MONITOR ..... Selects either input signal or reproduced signal on any channel.
- REFERENCE COUNTER ..... Four digit, pushbutton reset.
- POWER REQUIREMENTS ..... 117 volts A.C. 60 Hz — 110 watts maximum.
- DIMENSIONS ..... Panel: 8 3/4 " x 19" (slotted for rack mounting). Distance in front of panel for head  
cover and reels: 1 3/4 ", depth behind panel: 11 1/2 ".
- WEIGHT ..... Unmounted: 32 pounds net with all amplifiers for four channels.

Special Item No. 136-9

MODEL	CATALOG NUMBER	SPEED IPS	COM. PRICE	*GSA PRICE	DESCRIPTION
R70-2H	1280205	15/16	\$1346	\$1211	Two channel stereo, 1/2 track heads
	1280206	15/32			
R70-44	1440405	15/16	\$1811	\$1630	Four channel, 4 track-in-line heads, with four record electronics & four reproduce electronics
	1440406	15/32			
R70-41	1440505	15/16	\$1682	\$1514	Four channel, 4 track-in-line heads, with four record electronics and single reproduce electronics switchable from track to track.
	1440506	15/32			

\*GSA Discount is 10%



**R-70 OPTIONAL EQUIPMENT & ACCESSORIES**

DESCRIPTION	MODEL	CATALOG NUMBER	COM. PRICE	* GSA PRICE
<u>AUTOMATIC GAIN CONTROL</u> - amplifier, plug-in, 10,000 ohm bridging input. Holds constant recording level with input changes of -20 db to +20db.	AC-176	6903	\$ 54.50	\$ 49.05
<u>VOICE OPERATED RELAY</u> - to start/stop R70 when a voice or signal appears on any channel input. Consists of an amplifier and drive motor control plugged into the VOR socket of the R70.	VO-90	111002	\$155.00	139.50
<u>WARNING, END OF TAPE, ARM</u> - riding on tape reel furnishes switch contacts for remote indication purposes.	CUT	1105	19.00	17.10
<u>ERASE HEAD</u> - provides full width tape erasure.	FTE	9907	18.00	16.20
<u>RACK CABINET</u> - 61½" x 19" rack space. Overall dimensions 66½" high x 22" wide x 17½" deep.	RC-1	7903	181.00	162.90
<u>RACK CABINET</u> - for desk top use. Overall dimensions 9½" high x 24" wide x 15" deep.	RC-2	7904	85.00	76.50
<u>RACK CABINET</u> - for use with R70 and accessory equipment panels. Overall dimensions 24½" high x 22" wide x 17" deep.	RC-3	7905	100.00	90.00
<u>PORTABLE CARRYING CASE</u> - 8-3/4" x 19" panel space. Overall dimensions 10½" high x 19" wide x 17-3/4" deep.	CC-1	7901	91.00	81.90
<u>V.U. METER</u> - in illuminated "picture frame" with associated meter/monitor amplifier, mounted in center of R70 front panel (replaces loudspeaker).	VI-76	5201	26.00	23.40
<u>RECORDER CHANGEOVER PANEL</u> - a system connected to two R70. Either the built-in photo cells or the accessory CUT arm transfers operation from one R70 to a standby for continuous operation	CU-59	201052	114.00	102.60
<u>TIME SIGNAL MUTE PANEL</u> - permits the recording of both time information and audio information on the same track, giving priority to the audio signals and recording time signals between messages.	CU-99	201054	181.00	162.90
<u>RECALL PANEL</u> - Provides immediate playback of messages by back-spacing and replaying.	CU-110	201055	202.00	181.80
<u>V.U. METER</u> - illuminated with associated meter amplifier, AH76V, mounted in a 5½" x 19" panel. Used in conjunction with the R70 which provides all necessary input power.	IP76/VU	201058	140.00	126.00
<u>SLIDES, EXTENSIBLE</u> - to mount R70 in cabinet or carrying case. Panels may be withdrawn 11½" or completely removed.	SL-70	7920	31.00	27.90
<u>MONITOR SPEAKER PANEL</u> - matched with Monitor Amplifier, AW70L, mounted in a 5½" x 19" panel. Used in conjunction with the R70 or R75 which provides all necessary input power.	IP76/AW	201057	129.00	116.10
<u>POWER INVERTER</u> - 24VDC to 117VAC (60 Hz) to power R70 from batteries.	AW-150	701421	983.00	884.70
<u>AUTOMATIC TIME ANNOUNCER</u> - to furnish voice time announcements every 60 seconds. A built-in ACCUTRON(R) battery operated clock provides visual primary time standard and triggers the 60 second announcements.	TT-2460	701611	1501.00	1350.90
<u>DIGITAL TIME REFERENCE</u> - with display in hours, minutes and seconds. Readout from tape on separate unit displaying hours, minutes and seconds as recorded.	TT-2470	701612	2225.00	2002.50
<u>ALIGNMENT TAPE</u> - three inch reel with high frequency for head alignment and IKC tone for level set. Designated (-1) 7½ IPS; (-2) 3-3/4 IPS; (-3) 1-7/8 IPS; (-4) 15/16 IPS; (-5) 15/32 IPS.	SFT(-)	8932	10.50	9.45
<u>BULK TAPE ERASER</u> - completely erases full reel of ½" wide tape in one quick operation.	TM-99	9915	36.00	32.40
<u>HEAD DEMAGNETIZER</u> - a necessary tool for periodic maintenance, 117V 50/60 cycles.	TD-6	9934	10.50	9.45

\*GSA Discount is 10%

## MODEL TRC-89 TERMINAL RECORDER/REPRODUCER



The TRC-89 Terminal Recorder/Reproducer is an Automatic Terminal Information System (ATIS) designed to tape record airport control tower radio transmissions and repetitively rebroadcast the messages. Providing 24 hour continuous operation, the tape is contained by a snap-in cassette (foreground) capable of handling messages up to three minutes long. Having excellent voice quality and dynamic range, typical applications include weather reporting, aircraft landing instructions and other repetitive communications.

In a typical tower installation the Model CU-89 Remote Control (left) is mounted in the controllers console and it provides full operation of the Recorder/Reproducer which can be located in the main equipment room.

**FEATURES:** To minimize component wear, no belts, clutches, pinch wheels or capstans are used. A 60 RPM motor directly drives the tape. Rewind is accomplished by a direct drive 1200 RPM motor at 20 times normal speed, during which time the tape is relieved from the heads. Other features are:

- Noise cancelling microphone and Automatic Gain Control on input.
- Indicator lamp to warn of recording failure.
- Compact size: 5½" high by 19" wide and 15½" deep.
- Slide suspension mounting for easy withdrawal.
- Cassette tape loading for fast reload.
- Two track operation -- one track for message and one for rewind command signal.
- Plug in electronic modules housed in metal enclosures for electrostatic shielding and mechanical protection.
- Test points to meter all significant operational parameters.
- Built in meter for record and Bias level setting.



**MODEL TRC-89****BASIC OPERATION****GENERAL**

The recorder/reproducer may be locally or remotely operated. A front panel power switch establishes the control location and maintains priority of control. Power for the remote unit is only available when the power switch on the recorder/reproducer is set to REMOTE.

The remote may be located several hundred feet from the recorder/reproducer interconnected by 14 wires. Either location has full control facilities. Indicator lamps on both units display the status and operating modes. The close speaking microphone has high discrimination against background noise and the recording level as well as the direct microphone link to a transmitter is controlled by an AGC amplifier. An AGC switch is provided should it be desired to defeat the AGC action for testing purposes.

To RECORD A MESSAGE at the recorder/reproducer site:

1. Open access door to insert a cassette
2. Plug in microphone
3. Turn power switch to LOCAL
4. After five seconds press microphone button and hold microphone lip distance
5. When RED record light indicates, commence message at normal voice loudness regardless of ambient background noise.
6. Continue message for duration not to exceed three minutes.

**NOTE:**

While the message is being recorded, it is also normally being fed to a transmitter and/or a telephone line as indicated by the GREEN transmit light. Should the message exceed the three minute tape supply, the recording process stops and the LIMIT indicator is illuminated. However, the output to the transmitter or line will continue so long as the microphone button is pressed.

The LIMIT indicator has warned that the recorded message was not complete and must be recorded again within the tape length. The new recording is actuated by pressing the LIMIT switch which will rewind the tape clear of the tail leader area. After holding the LIMIT switch for approximately two seconds, press the microphone button and start the message when the RED record light indicates.

7. Regardless of the message length -- so long as it is within the three minute tape capacity -- the tape will high speed rewind to the clear leader at the beginning of the tape when the microphone button is released. A photocell detects the leader, stops and reverses the tape and proceeds at its normal forward speed. When the opaque tape area is sensed, the GREEN TRANSMIT light indicates that the message is being reproduced and transmitted.

Until the microphone button is pressed again, the message will reproduce, rewind and continually replay.

8. When a new message is recorded a COMMAND TONE is automatically inserted on the second recorded track when the microphone button is released at the end of the message. This COMMAND TONE automatically establishes rewind at the end of each message replay cycle.
9. Normally the recorder/reproducer is prepared with a fresh cassette each week and operationally checked following which the POWER SWITCH is turned to REMOTE so that the message may originate in a control tower or command post.
10. To record from the REMOTE CONTROL location.
  - a) Plug in microphone
  - b) Turn POWER ON
  - c) AGC switch ON
  - d) Press microphone button
  - e) When RED record light indicates, start message
  - f) Release microphone button at end of message
  - g) If desired, the message content and quality may be monitored by inserting a head phone plug into the jack on the remote panel

**CASSETTE**

Previous models of repetitive replay systems have used drums, endless tape loops or special open tape storage methods. The unique design of the TRC-89 recorder/reproducer incorporates a rugged cassette which offers many features:

1. Fast load for instant cassette change.
2. Cassettes with critical recordings may be easily stored for future reference.
3. As new more efficient and durable tapes are developed they may be easily threaded into the cassettes.
4. The cassette design both shields and protects the tape.

The cassettes are of special manufacture to handle  $\frac{1}{4}$ -inch wide tape as originally specified by the Air Force. The  $\frac{1}{4}$ -inch tape width provides better life and more stable output than the home entertainment 0.150-inch tape width.

To meet the three minute time capacity, 67 feet of  $\frac{1}{4}$ -inch tape is prepared by dissolving and removing 15 inches of emulsion from each end to provide clear leader for photocell sensing. End of tape leader is fastened by an adhesive 1 mil "mylar" tape to removable hubs of the cassette.

It is recommended that new tape be threaded each week. As an example of the number of cycles of operation in a week, assume that a typical message is of 60 seconds duration. From the command tone, through the rewind sequence and to the start of the message is five seconds -- or, 65 seconds per cycle. In one day this amounts to 1329 message cycles or in one week, 9303 cycles.

Observation of a heavily used commercial airport indicates an average length of message to be less than 45 seconds or more than 12,000 message cycles per week!

## MODEL TRC-89

## TECHNICAL SPECIFICATIONS

RECORDING CHANNELS.....	two
HEAD TYPES.....	Quantity 3, slip mount, prealigned. 2 - Two channel in-line heads for record/ playback 1 - Ferrite full track erase head
INPUT.....	NOTE: The tape is clear of the heads during the high speed rewind. Two inputs are provided 1) LINE INPUT, 600 ohm (from remote control). Level is screw driver set between -10 dbm to +10 dbm 2) MICROPHONE, high impedance (close speaking type with noise cancellation provided). Microphone Level -40 db to -20 db Microphone jack - 3 circuit
AUTOMATIC GAIN CONTROL.....	The two inputs are fed through an AGC amplifier to hold the record level and transmit level within $\pm 3$ db.
OUTPUT CONNECTOR.....	Audio barrier strip terminals
OUTPUT LEVEL.....	600 ohms (transmit) adjustable -10 dbm to +10 dbm (nominally set at 0 dbm) NOTE: An accessory VU meter may be connected to this line.
FREQUENCY RESPONSE.....	Less than 6 db variation 300 Hz to 3000 Hz
CASSETTE CAPACITY.....	3 minutes
REWIND RATIO.....	20 to 1
SIGNAL TO NOISE.....	Better than 50 db
DISTORTION.....	Less than 3% third harmonic at 300 Hz and 1000 Hz
FLUTTER.....	Less than 3% rms for all components between 0.5 and 300 Hz
CROSSTALK.....	(Between voice and rewind command tone) -- better than -50 db
INPUT POWER.....	115/230 volts AC $\pm 5$ volts 50/60 Hz 60 watts. NOTE: No tape drive mechanical changes are required between 60 Hz and 50 Hz operation. There is a slight fall off of 3000 Hz response at 50 Hz line frequency. Input transformer may be strapped for either voltage.
POWER CONNECTOR.....	Two prong with separate ground pin.
PLUG IN MODULES.....	Eight, housed in color-coded metal enclosures: Automatic Gain Control Amplifier Model AC-89 Line Amplifier Model AH-89 Record Amplifier Model AR-89 Playback Preamplifier Model AP-89 - 2 each Electric Switch Amplifier Model ESA-89 Bias Oscillator Model AO-89 Fail Amplifier Model FA-89
PLUG IN RELAYS.....	Seven: Command Tone Record Record Interlock Forward/Rewind Mute Limit Head, Record/Play
CONTROLS & SWITCHES (front panel).....	OUTPUT to Transmitter ON/OFF AGC ON/OFF POWER OFF/LOCAL/REMOTE RECORD LIMIT (end of tape) RESET
CONTROLS ON CHASSIS.....	Photo Cell Sensitivity Channel 1 Bias Betting Channel 2 Bias Setting 600 ohm INPUT



Model TRC-89    Technical Specifications (Continued)

TEST POINTS (on chassis).....	INPUT OUTPUT AGC Amplifier INPUT Channel 1 RECORD Channel 2 RECORD Rewind Command Tone Playback Output +22V Regulated +34V Unregulated Ground
CHASSIS MOUNT METER WITH TEST POINTS...	Bias Current Channel 1 & 2 Record Current Channel 1 & 2
INDICATOR LAMPS.....	TRANSMIT.....Green RECORD.....Red LIMIT.....Blue FAIL.....Amber POWER ON.....White
FUSING.....	AC 2 amperes DC 2 amperes
JACKS.....	Input Microphone Output Monitor

Model CU-89 Remote Control

Technical Specifications

Special Item #136-23

INPUT .....	Microphone, 3 circuit
OUTPUT CONNECTOR.....	Multi Pin
OUTPUT LEVEL.....	"0" dbm 600 ohms (transformer)
FREQUENCY RESPONSE.....	Dynamic range and distortion comparable with TRC-89 Recorder/Reproducer
INPUT POWER.....	Obtained from TRC-89
PLUG IN MODULES.....	One, housed in color-coded metal enclosure Line Amplifier and Microphone Preamplifier, Model AH-89M
DIMENSIONS.....	4" wide x 5" high x 8" deep
CONTROLS & SWITCHES (front panel).....	AGC ON/OFF POWER ON/OFF RECORD LIMIT (end of tape) RESET
INDICATOR LAMPS.....	TRANSMIT.....Green RECORD.....Red LIMIT.....Blue FAIL.....Amber POWER ON.....White
TEST POINTS (on chassis).....	600 ohm output

# **MODEL TRC-89** **TERMINAL RECORDER/REPRODUCER**

Special Item #136-24

MODEL	DESCRIPTION	CATALOG NO.	PRICE	*NET GSA
TRC-89	Recorder/Reproducer Set -- includes CU-89 Remote Control Unit, microphone and one tape cassette	1224117	\$1945.00	\$1750.00

## REPAIR PARTS

Special Item #136-23

MODEL	DESCRIPTION	PART NO.	CATALOG NO.	PRICE	*NET GSA
ESA-89	ELECTRONIC SWITCHING AMPLIFIER	07-087	6984	52.00	\$47.00
AC-89	AUTOMATIC GAIN CONTROL AMPLIFIER	07-088	6906	70.00	63.00
FA-89	FAILSAFE AMPLIFIER	07-089	6987	43.00	39.00
AH-89	LINE AMPLIFIER	07-090	6925	50.00	45.00
AR-89	RECORD AMPLIFIER	07-091	6953	50.00	45.00
AP-89	PLAYBACK AMPLIFIER	07-092	6943	43.00	39.00
AO-89	OSCILLATOR	07-093	6938	46.00	41.50
AH-89M	AMPLIFIER, Microphone/Line	07-120	6917	54.00	49.00
TTRR-89	HEAD, Record/Reproduce	24-007	9922	30.00	27.00
TTE-89	HEAD, Erase	24-008	9923	47.00	42.50
CA-89	CASSETTE	10-008	8927	34.00	31.00
MT-89	ALIGNMENT GUIDE	56-001	56-001	7.00	6.50
M-89	MICROPHONE	08-099	5101	50.00	45.00
MTR-89D	MOTOR, Drive	35-006	5901	40.00	36.00
MTR-89R	MOTOR, Rewind	35-007	5902	56.00	50.50
CU-89	REMOTE CONTROL UNIT	10-007	201050	165.00	148.50

\*GSA Discount is 10%



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25 August 1972

NEW  
GSA CATALOG LISTINGS  
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MAGNETIC TAPE VOICE RECORDERS

ATTENTION: PROCUREMENT

The enclosed catalog covers single and multi-channel voice recorder/reproducers most commonly used for:

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Instruction

In fact, whenever you need a record of the spoken word, there are models available which can record up to 50 hours continuously.

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